Rewiring a Microbial Chassis to Optimize Electrosynthesis

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MAJOR GOALS

The overall long-term objective of these studies is to develop a chassis microbe for high-rate microbial electrosynthesis, significantly improving the electrical contacts with cathodes and long-range electron transport through cathode biofilms. The research aims to be accomplished in this proposal are to 1) identify the bioelectrical plugs for establishing direct cell-electrode electrical contacts for electron transfer into cells in a potential gram-positive (Clostridium ljungdahlii) and gram-negative (Geobacter sulfurreducens) chassis for electrosynthesis; 2) determine the biocircuitry required to establish long-range electron transport through cathode biofilms; and 3) combine discoveries from Aims #1 and #2 to rewire a chassis for enhanced cathode-to-cell electron transfer.

ACCOMPLISHED

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PLANS

(b) (4)

TECHNOLOGY TRANSFER

Patent Updated:Microbial Nanowires with Increased Conductivity and Reduced Diameters A collaboration has been further developed with LanzaTech (http://www.lanzatech.com/) to further enhance microbial electrosynthesis through improved reactor and strain design.

ARTICLES

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Ramesh Y. Adhikari, Nikhil S. Malvankar, Mark T. Tuominen, Derek R. Lovley, Conductivity of individual Geobacter pili, RSC Adv., Volume: 6, Issue: 10, First Page Number: 8354, Date Published: , Publication Status: Published, Publication Type: DOI, Publication ID 10.1039/C5RA28092C, Peer Reviewed: Y, Federal Support Acknowledgement: Y

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